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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/602,558	06/23/2000	Toshiyuki Okuyama	5551-2	1024

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EXAMINER

LUGO, DAVID B

ART UNIT	PAPER NUMBER
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2611

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/602,558

Applicant(s)

OKUYAMA ET AL.

Examiner

David B. Lugo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 1,2,5-8,11,12,14 and 15 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 16 is/are allowed.
- 6) ☒ Claim(s) 3,4,9 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 9/5/06 have been fully considered but they are not persuasive. Regarding claim 3, Applicant argues that Leonard does not teach that "the frequency error correcting device maintains the amplitude information of the I and Q components of the complex base band signal" because Leonard discloses that the phase of the vector representing the I and Q components is quantized, where Applicant further states that in this field, "quantizing" means that the amplitude information is removed. The Examiner respectfully disagrees. Applicant has stated in the second paragraph of page 3 of the Remarks filed 1/26/06: "On the transmit end of a communication system, QPSK, by definition, includes modulating the phase of a carrier signal by a signal (i.e. the amplitude of the signal) that is to be transmitted. As a result, the phase of the modulated carrier signal corresponds to the amplitude of the modulating signal." Thus, the I and Q components corresponds the phase of the modulated carrier signal which represents the amplitude of the modulating signal. In order to correctly recover any transmitted data, this "amplitude" information must be maintained. If this information were not maintained, any attempted communication would be pointless as the transmitted data represented by this information would be lost and communication would be unsuccessful. Accordingly, since the transmitted data is actually recovered in the receiver of Leonard, as is the case in any functioning data receiver, amplitude information representing the data that is used to modulate the carrier wave is maintained throughout the reception process. Further, the "quantizing" of Leonard does not mean that amplitude information is removed, as contended by Applicant, but rather, it indicates that the phase information is assigned to one of several distinct levels. The

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information represented by the phase of the vector representing the I and Q components is not lost, because the phase is merely assigned to the phase octant that the received sample is in (col. 3, lines 59-64). The information is maintained, as the acquisition processor indicates proper acquisition of the received signal $r(t)$ (col. 2, lines 61-65), and correlation is performed with the same spreading sequence used in the transmitter (col. 4, lines 41-55), which would not be possible if the amplitude information corresponding to the modulating signal represented by the phase information is not maintained.

The rejection of claims 3, 4, 9 and 10 are maintained, and are restated below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission of prior art (APA) in view of Leonard et al. U.S. Patent 5,285,472.

Regarding claim 3, Applicant discloses in Fig. 19, a prior art reverse spreading device comprising complex matched filters (131, 132). Conventional matched filters, according to prior art Fig. 13, include a spread code multiplier that multiplies complex baseband signals by spread codes and accumulative adders that produce correlation values by performing accumulative addition of the multiplied value for a symbol period of each of the I or Q components.

Applicant's APA does not disclose a frequency error correcting device that counts the number chips of an input complex baseband signal and sequentially rotates a phase of the

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complex baseband signal to produce a rotated corrected complex baseband signal, where the frequency error correcting device maintains the amplitude information of the I and Q components in the rotated corrected complex baseband signal.

Leonard et al. disclose correction of a frequency offset in a despreading device by rotating the phase of the baseband signal in 45° steps at eight times per cycle via a phase rotator and a modulo 8 counter prior to despreading (see Fig. 3; col. 3, lines 19-26). As indicated by Applicant in pages 2-3 of the response filed 1/26/06 (hereinafter "Remarks"), it is inherent that amplitude information is represented by a modulated complex baseband signal, as the phase of the modulated carrier signal corresponds to the amplitude of the modulating signal (see Remarks, page 3, second paragraph). Accordingly, in Leonard et al., amplitude information is maintained as the in-phase and quadrature components are treated as a vector which is quantized to an octant in quantizer 36 (col. 3, lines 59-68), the amplitude information of the modulating signal being maintained corresponding to the phase of the complex baseband signal represented by the quantized octant.

It would have been obvious to one of ordinary skill in the art to use the frequency correction techniques employed by Leonard et al. in the reverse spreading device disclosed in the Applicant's APA to help eliminate frequency offset (see col. 5, lines 24-30).

Regarding claim 4, in column 3, lines 19-24, Leonard et al. state that the phase of the signals are rotated to cancel out the offset frequency component by incrementing the phase in 45° steps (i.e. $2\pi/M$ where $M=8$) at eight times per cycle. Thus, the function of the mod 8 counter is equivalent to that performed by the chip number counter and the step number counter combined, as the mod 8 counter supplies a signal to the phase rotator to increment the phase used in the

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phase rotation in cyclical steps from 0 to M-1 (where M equals 8) in accordance with the modulo operation, and the step is incremented when the number of chip periods (k) supplied from clock f_c , which is at the chip rate, corresponds to one eighth of a frequency cycle (i.e. $1/8$ of 2π).

Further, one of ordinary skill in the art would recognize that the mod 8 counter may be implemented using separate counters including a counter for counting the number of chips, and a separate counter for performing the modulo operation. Accordingly, it would have been obvious to one of ordinary skill in the art to implement the mod 8 counter of Leonard et al. using a chip number counter and a step number counter, as this is deemed a design consideration that fails to patentably distinguish over the prior art of record.

Regarding claim 9, Applicant further discloses in prior art Fig. 19, a peak detecting section 137.

Regarding claim 10, Applicant further discloses in prior art Fig. 12, a despreading device included in a channel estimating device along with a rotation correcting circuit for detecting and correcting phase errors.

Allowable Subject Matter

4. Claims 13 and 16 are allowed.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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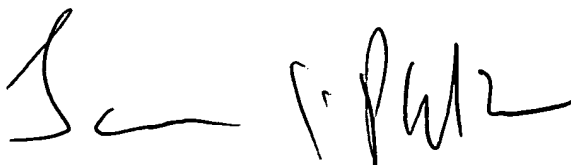
the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Lugo
11/9/06



JAY K. PATEL
SUPERVISORY PATENT EXAMINER